02920 – SEEDING, SODDING AND GROUNDCOVER

(Last Revised 3/29/05)

SELECTED LINKS TO SECTIONS WITHIN THIS SPECIFICATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this specification.

B. Section 02200 – EARTHWORK.

C. Section 02275 – TRENCHING, BACKFILLING, & COMPACTION OF UTILITIES

D. Section 02510 – WATER DISTRIBUTION

E. Section 02530 – SANITARY SEWER

F. Section 02630 – STORM DRAINAGE

1.2 SUMMARY

A. This section includes preparation of surfaces and application for seeding and sodding of areas proposed to stabilized and landscaped in utility easements, on sites, along roadways and other applicable areas disturbed by construction.

B. This specification covers seeding, sodding and groundcover but excludes trees, shrubs, plants, edgings, planters and irrigation.

1.3 DEFINITIONS

A. **GENERAL**: For the purposes of this specification, the following definitions refer to landscaping items that come under the authority of the City of Fairfax as specified within this section and other sections of this manual.

1) **Finish Grade**: In terms of landscaping, the surface that has been established, graded, raked, and prepared to receive groundcover, fertilizer, seed, and mulch; the finished surface of planting soil.

2) **Groundcover**: The vegetative material placed on a prepared surface and used to stabilize a soil from erosion.

3) **Sod**: An existing established matt of grass that has been removed from one area by a mechanical harvesting means and transferred to a prepared subgrade at another location; used to render a finished appearance and/or provide immediate resistance to erosion.

4) **Subgrad**e: Surface or elevation remaining after completing the excavation before placement of topsoil.

5) **Topsoil**: Either native or imported topsoil or a surface soil modified to become topsoil, which is primarily organic in nature, free of rocks, clumps of clayey soils and otherwise friable in texture.

1.4 SUBMITTALS

A. Submit product data and shop drawings for the following:

1) Seed certification: All seed shall be labeled to show it meets Virginia Seed Law requirements. All seed must have been tested within 6 months of planting.

2) A seed bag tag shall be submitted with final payment request from each type or mixture of seed used.

3) Topsoil analysis, if requested by City Engineer. Soil testing shall state percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil. Report is to state suitability of topsoil for lawn growth and recommend quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

1.5 QUALITY ASSURANCE

A. Materials and operations shall comply with the latest revision of all applicable Codes and Standards.

1.6 QUALITY STANDARDS

A. Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

American National Standards Institute

ANSI Z60.1 American Standard for Nursery Stock

American Society for Testing and Materials

ASTM C602 Specification for Agricultural Liming Materials

ASTM D5268 Specification for Topsoil Used for Landscaping purposes

1.7 STANDARD ABBREVIATIONS

AASHTO American Association of State Highway Transportation Officials.

ANLA	American Nursery & Landscaping Association
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
FS	Federal Specifications
MSDS	Material Safety Data Sheets
VDOT	Virginia Department of Transportation
NCSPA	Virginia Sod Producers Association
USDA	United States Department of Agriculture

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

A. **Handling/Storage**:

1) See Part 3 - EXECUTION of these specifications for handling of sod materials during placement.

2) Observe Nursery's directions for delivery and storage of seed and sod materials.

3) Store and protect fertilizer and lime until item is applied.

1.9 PROJECT CONDITIONS

A. The Contractor is responsible for obtaining all applicable permits (encroachment, grading, etc.), making application, and paying permit fees.

B. Seed mixture shall be chosen to insure the development of plants during the season of planting, and to insure future growth and permanence.

C. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.

D. **Temporary Seeding**: Denuded areas to be graded during the construction phases that are not to be brought to final grade within 30 days shall receive temporary seeding within 15 days of completing initial earthwork. Note that the time for establishment of permanent ground cover is 15 working days or 30 calendar days whichever is shorter. Temporary seeding shall also be used to stabilize finished grade areas if the time of year is outside the specified permanent seeding periods.

E. **Environmental - Wetlands**: Before crossing or entering into any jurisdictional wetlands, Contractor shall verify whether or not a wetlands permit has been obtained for the encroachment and whether special restrictions have been imposed. Care shall be taken not to landscape and otherwise prevent draining or otherwise destroying non-permitted wetlands unless a permit has been obtained. Restore such areas as stated on either the project drawings, the contract

documents, and/or as noted in the permit. All encroachments shall be subject to US COE approval and permitting conditions.

F. **Safety**: The contractor shall keep the surface in a safe a satisfactory condition during the progress of the work.

G. After seeding and mulching, care shall be taken to prevent future runoff destruction of seeded areas.

1.10 LOCATING SERVICES

Contact the City of Fairfax Utlities Department to coordinate operation of valves and making taps for and/or constructing irrigation services. If interruption is of water service is necessary, the interruption shall be arranged to occur at such a time to cause the least disruption and minimize loss of service. Provide a minimum of 48 hours notice of the proposed utility interruption or necessary operation of valves.

1.11 COORDINATION

A. Coordinate placement of groundcover with other Contractors and with the City of Fairfax Engineer.

B. Proceed with planting only when existing and forecasted weather conditions permit.

C. Protect undisturbed lawns, shrubs and trees and promptly repair damages caused by seeding, sodding and groundcover operation.

1.12 WARRANTY

Warranty period for groundcover: 12 months from date of substantial completion if not designated as temporary cover.

PART 2 – PRODUCTS

2.1 MISCELLANEOUS

2.1.1 FERTILIZER

A. **Commercial Fertilizer**: Standard commercial-grade complete fertilizer of neutral character, consisting of fast and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium. Fertilizer shall meet the requirements of Fed. Spec. O-F-241 and the applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis to contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

B. **Slow-Release Fertilizer**: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

Fertilizers may be supplied in one of the following forms:

1) A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

2) A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

3) A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be 10-20-10 commercial fertilizers.

2.1.2 LIME

A. **Lime**: ASTM C602, *Standard Specification for Agricultural Liming Materials* agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, Class O, with a minimum 95 percent passing through No. 8 sieve and a minimum 55 percent passing through No. 60 sieve. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Liming shall be applied at the rate shown on the plans.

If ordered by the City Engineer, a pelted form of limestone with a water-soluble binder may be required to speed breakdown of limestone.

2.1.3 MULCH MATERIAL.

A. **General**: Acceptable mulch shall be the materials listed below or any approved locally available material that is similar to those specified. Low grade, musty, spoiled, partially rotted hay, straw, or other materials unfit for animal consumption will be acceptable. Mulch materials, which contain matured seed of species, which would volunteer and be detrimental to the proposed overseeding, or to surrounding farmland, will not be acceptable. Straw or other mulch material which is fresh and/or excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

B. **Hay**: Hay shall be native hay, sudan grass hay, broomsedge hay, legume hay, or similar hay or grass clippings.

C. **Straw**: Straw shall be the threshed plant residue of oats, wheat, barley, rye, or rice from which grain has been removed.

D. **Hay Mulch Containing Seed**: Hay mulch shall be mature hay containing viable seed of native grasses or other desirable species as approved by the City Engineer. The hay shall be cut and handled so as to preserve the maximum quantity of viable seed. Hay mulch, which cannot be hauled and spread immediately after cutting shall be placed in weather-resistant stacks or baled and stored in a dry location until used.

E. **Manufactured Mulch**: Cellulose-fiber or wood-pulp mulch shall be products commercially available for use in spray applications.

F. **Asphalt Binder**: Asphalt binder material shall conform to the requirements of ASTM D977, *Standard Specification for Emulsified Asphalt*, Type SS-1 or RS-1.

2.1.4 SOIL FOR REPAIRS

The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the City Engineer before being placed.

2.1.5 SEED

The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Fed. Spec. JJJ-S-181B, Agricultural Seed.

Seed shall be furnished separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.

Seed shall be applied at the rates and during the times/seasons stipulated on the plans.

2.1.6 TOPSOIL

A. **Topsoil**: Comply with ASTM D 5268, *Standard Specification for Topsoil Used for Landscaping Purposes* pH range of 5.5 to 7, a minimum of 4% organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1) On-site Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth. Provide erosion control measures to prevent erosion, loss, and off-site deposition of topsoil.

   a. Contractor may supplement on-site source with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches in depth. Do not obtain from swamps or marshes.

2) Off-site Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches in depth. Do not obtain from swamps or marshes.

PART 3 – EXECUTION

3.1 CONSTRUCTION OF SUBGRADE

3.1.1 EXCAVATION, GRADING AND SUBGRADE PREPARATION FOR SEEDING/SODDING: Excavation, grading and subgrade preparation for seeding and/or sodding shall be in strict compliance with Section 02200 – *Earthwork* and Section 02275 – *Trenching, Backfilling, and Compaction of Utlities*, and this specification section, as applicable. The subgrade upon which this work is to be placed shall be smoothly shaped and compacted to a firm, even surface conforming to the elevation and cross-sections shown on the plans, the standard drawings, or as directed by the City Engineer. All soft, frozen, and unsuitable material shall be removed and replaced with approved material.

3.1.2 FINE GRADING (Trimming): Fine grading shall be the responsibility of the Contractor to insure that the finished grade conforms to the proposed finished grades as shown on the plans and the applicable standard details.

3.2 SEEDING, SODDING, AND GROUNDCOVER

3.2.1 GENERAL

Seeding and groundcover includes seedbed preparation, liming, fertilizing, seeding, and mulching of all disturbed areas. Areas inside or outside the limits of construction that are disturbed by the Contractor's operation and activity shall be seeded and mulched.

A. Unless called for otherwise on the Erosion and Sedimentation Control Plan, in areas where natural sod or vegetation has been disturbed, the area shall be fertilized, limed, seeded, and mulched in accordance with these specifications.

   If a utility line is installed through a landscaped lawn, the seeding shall be modified to restore ground cover comparable to the existing lawn.

B. Seeding shall be carried out as soon as practical after the construction in any one area, and shall be maintained against erosion through the completion of the project. Seeding shall be accomplished as work progresses.

   The Contractor shall be responsible for proper care of the seeded area during the period that vegetation is being established. In the event of an erosive rain before an adequate stand of vegetation has been established, damaged areas shall be repaired, fertilized, seeded, and mulched at the Contractor's expense.

C. Seeding on rights of way of VDOT maintained roads shall be in accordance with VDOT specifications and the requirements of the approved encroachment permit.

D. **Stockpile Area**: The Contractor is responsible for securing a material lay down and stockpile storage area for this contract. As such, the Contractor is responsible for the necessary erosion control measures, including but not necessarily limited to, a construction entrance, silt fence, protection of streams/buffers, clean up and restoration of site to the satisfaction of the City. Stockpile and/or waste areas must be maintained within the limits of the areas protected by the proposed measures and otherwise temporarily seeded if to be left stockpiled over 30 days.

3.2.2 SODDING/SEEDING

A. **GENERAL**

The goal of sodding/seeding, where specified, is to return the disturbed area to its original vegetative condition, and to return the area to an aesthetically pleasing environment. Thus, all sodding/seeding shall meet the following requirements:

Any questionable areas shall be restored in the manner (sodded or seeded) determined on site by the City Engineer or his representative.

Vegetative restoration (sodding or seeding) shall be done as the work progresses. Areas to be protected by a vegetative cover include, but are not limited to, any areas disturbed during construction that are not otherwise stabilized by gravel, concrete, or asphaltic paving, or other impervious built-upon surface.

Any area disturbed without owner authorization will be restored by the Contractor at his own expense. In all cases the Contractor will guarantee a stand of grass over the entire area.

The work to be done to acquire the necessary vegetative cover shall include but is not specifically restricted to appropriate tilling of the area, the application of fertilizer and lime for areas to be seeded, placement of sod, or sowing of seed and placing of a straw mulch to hold the seed and soil in place until germination and growth occur.

After bringing the area to be sodded or seeded to proper grade, the entire area shall be tilled to a minimum depth of 4 inches by discing, harrowing, or other approved means. Following tilling, all large debris and stones shall be removed to the satisfaction of the City Engineer and the surface leveled.

3.2.3 SODDING

All existing ornamental grass stands (commercial or private lawns) may be carefully taken up, protected and replaced to their original condition or the Contractor may elect to install new sod of the same grass type. Sod furnished by the Contractor shall have a good cover of living or growing grass. This shall be interpreted to include grass that is seasonally dormant during the cold or dry seasons and capable of renewing growth after the dormant period. All sod shall be obtained from areas where the soil is reasonably fertile and contains a high percentage of loamy topsoil. Sod shall be cut or stripped from living, thickly matted turf relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials, which might be detrimental to the development of the sod or to future maintenance. At least 70% of the plants in the cut sod shall be composed of the existing lawn species, and any vegetation more than 6 inches in height, shall be mowed to a height of 3 inches or less before sod is lifted. Sod, including the soil containing the roots and the plant growth showing above, shall be cut uniformly to a thickness not less than 2 inches.

After inspection and approval of the source of sod by the City Engineer, the sod shall be cut with approved sod cutters to such a thickness that after it has been

compacted, it shall have a uniform thickness of not less than 2 inches. Sod sections or strips shall be cut in uniform widths, not less than 10 inches, and in lengths of not less than 18 inches, but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stored in an unrolled condition, irrigated, and protected from exposure to air drafts and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, permission to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the Director, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitchforks shall not be used to handle sod, and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and insure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen when replacing it shall work from ladders or treated planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sod sections. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately 1 inch below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaced around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

On slopes steeper than 1 vertical to 2 1/2 horizontal and in V-shaped or flat bottom ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches in length and have a cross-sectional area of not less than ¾ square inch. The pegs shall be driven flush with the surface pf the sod.

Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist until it has become established and its continued growth assured. Contractor shall water sodded areas a minimum of 1 inch of water, twice per week until re-established and once per week thereafter until work is accepted. In all cases, watering shall be done in a manner, which

will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

3.2.4 SEEDING

A. ADVANCED PREPARATION AND CLEANUP

Dense or compacted soil areas and cut grade soil areas shall be ripped at greater than 6 inches of depth with a spring toothed ripper or similar equipment after finish grade but before tillage. Severely compacted surfaces shall be ripped to at least 12-inches of depth. No compaction soils shall be covered with soil fill until ripped. Finish grades on slopes exceeding 30% shall be roughened parallel to contours to maximize surface storage and minimize runoff.

After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches in any diameter, sticks, stumps, and other debris which might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches as a result of grading operations and, if immediately prior to seeding, the top 3 inches of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

However, when the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches. Clods shall be broken and the top 3 inches of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

B. DRY APPLICATION METHOD

1) **Liming**

Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds, which have previously been prepare as described above. The lime shall then be worked into the top 3 inches of soil after which the seedbed shall again be properly grade and dressed to a smooth finish.

2) **Fertilizing**

Following advance preparations and cleanup, fertilizer shall be uniformly spread at the rate specified on the plans.

3) **Seeding**

Grass seed shall be sown at the rate specified in on the plans immediately after fertilizing and the fertilizer and seed raked into the soil. Seeds or legumes, either alone or in mixtures, shall be inoculated before mixing or sowing in accordance with the instructions of the manufacturer of the inoculant. When seeing is required at other than the seasons shown on the plans, a cover crop shall be sown by the same methods required for grass and legume seeding.

4) **Rolling**

After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller weighing 40 to 65 pounds per foot of width for clay soil (or any soil having a tendency to pack) or weighing 150 to 200 pounds per foot of width for sandy or light soils.

C. **WET APPLICATION METHOD**

1) **General**

The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified on the plans.

2) **Spraying Equipment**

The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons over the entire range of the tank capacity, mounted so that it is visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons per minute at a pressure of 100 psi. The pump shall be mounted in a line, which will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, 3-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet.

One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet in length shall be provided to which the nozzles may be connected.

3) **Mixtures**

Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds of lime shall be added to and mixed with each 100 gallons of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds of these combined solids shall be added to and mixed with each 100 gallons of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Brackish water shall not be used at any time. The Contractor shall identify to the City Engineer all sources of water at least 2 weeks prior to use. The City Engineer may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source which is disapproved by the City Engineer following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within 2 hours from the time they were mixed or they shall be wasted and disposed of at locations acceptable to the City Engineer.

4) **Spraying**

Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches, after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray which shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to insure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made

by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces, which are to be mulched as indicated by the plans or designated by the City Engineer, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

3.2.5 MULCHING

A. **MULCHING**

Seeding shall be followed by placement of a suitable cover of clean straw or approved equivalent mulch.

In the case of sloping areas exceeding 1 vertical to 3 horizontal or other areas of more concentrated storm water runoff, the straw shall be stabilized by the application of an asphalt emulsion or other approved binding materials. Alternative methods such as hydro-seeding or hydro-mulching may be considered on an individual basis.

Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding. The spreading of the mulch may be by hand methods, blower, or other mechanical methods, provided a uniform covering is obtained.

Mulch material shall be furnished, hauled, and evenly applied on the area shown on the plans or designated by the City Engineer. Straw or hay shall be spread over the surface to a uniform thickness at the rate of 2 to 3 tons per acre to provide a loose depth of not less than 1-1/2 inches nor more than 3 inches. Other organic material shall be spread at the rate directed by the City Engineer. Mulch may be blown on the slopes and the use of cutters in the equipment for this purpose will be permitted to the extent that at least 95% of the mulch in place on the slope shall be 6 inches or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall be not less than 1 inch nor more than 2 inches.

B. **SECURING MULCH**

The mulch shall be held in place by light discing, a very thin covering of topsoil, small brush, pins, stakes, wire mesh, asphalt binder, or other adhesive material approved by the City Engineer. Where mulches have been secured by either of the asphalt binder methods, it will not be permissible to walk on the slopes after the binder has been applied. The Contractor is warned that in the application of asphalt binder material he must take every precaution to guard against damaging or disfiguring structures or property on or adjacent to the areas worked and that he will be held responsible for any such damage resulting from his/her operations.

If the “peg and string” method is used, the mulch shall be secured by the use of stakes or wire pins driven into the ground on 5-foot centers or less. Binder twine shall be strung between adjacent stakes in straight lines and crisscrossed diagonally over the mulch, after which the stakes shall be firmly driven nearly flush to the ground to draw the twine down tight onto the mulch.

C. **CARE AND REPAIR**

1) The Contractor shall care for the mulched areas until final acceptance of the project. Such care shall consist of providing protection against traffic or other use by placing warning signs, as approved by the City Engineer, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

2) The Contractor shall be required to repair or replace any mulching that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the City Engineer, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor. However, once the Contractor has completed the mulching of any area in accordance with the provisions of the specifications and to the satisfaction of the City Engineer, no additional work at his/her expense will be required, but subsequent repairs and replacements deemed necessary by the City Engineer shall be made by the Contractor and will be paid for as additional or extra work.

3) If the “asphalt spray'” method is used, all mulched surfaces shall be sprayed with asphalt binder material so that the surface has a uniform appearance. The binder shall be uniformly applied to the mulch at the rate of approximately 8.0 gallons per 1,000 square feet, or as directed by the City Engineer, with a minimum of 6.0 gallons and a maximum of 10 gallons per 1,000 square feet depending on the type of mulch and the effectiveness of the binder securing it. Bituminous binder material may be sprayed on the mulched slope areas from either the top or the bottom of the slope. An approved spray nozzle shall be used. The nozzle shall be operated at a distance of not less than 4 feet from the surface of the mulch and uniform distribution of the bituminous material shall be required. A pump or an air compressor of adequate capacity shall be used to insure uniform distribution of the bituminous material.

4) If the “asphalt mix” method is used, the mulch shall be applied by blowing, and the asphalt binder material shall be sprayed into the mulch as it leaves the blower. The binder shall be uniformly applied to the mulch at the rate of approximately 8.0 gallons per 1,000 square feet or as directed by the City Engineer, with a minimum of 6.0 gallons and a maximum of 10 gallons per 1,000 square feet depending on the type of mulch and the effectiveness of the binder securing it.

3.2.6 MAINTENANCE OF SEEDED/SODDED AREAS:

The City will provide water through a metered billable system (usually from a fire hydrant) to the Contractor at his expense for watering and maintenance of

restored vegetation. Contractor shall provide a suitable backflow prevention devise for filling of water tank trucks or trailers. Contractor shall water sodded/seeded areas with a minimum of 1 inch of water, twice per week until sod/seed is (re)established and once per week thereafter until work is accepted. The Contractor shall provide general care for the restored areas as soon as the sod has been laid (or seeded and mulched), and such care shall continue until final inspection and acceptance of the work. All restored areas shall be protected against traffic or other use by warning signs or barricades approved by the City.

The Contractor shall mow the sodded and/or seeded areas with approved mowing equipment, depending upon climatic and growth conditions and the need for mowing specific areas. In the event that weeds or other undesirable vegetation are permitted to grow to such an extent that, either cut or uncut, they threaten to smother the species, they shall be mowed and the clippings raked and removed from the area. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the City Engineer, and shall then be sodded, or seeded, as specified.

3.2.7 ACCEPTANCE:

A stand of grass shall be considered acceptable when areal cover is at least 95%. The contractor shall overseed, and otherwise maintain the grassed areas until the stand of grass has reached a uniform height of 3 to 4 inches and a state of uniform species maturity. Annual weed grasses and grain weeds shall not be considered part of the areal cover, and seeding stands shall not be considered acceptable until the stand reaches a state of uniform post-seeding maturity for the specified species.

If straw mulching results in competing stands of grain, maintenance shall include mowing of the grain weed stand to a height of 4 inches prior to reaching a height of 10 inches. Grain weed stands shall not be considered part of the minimum 95% areal cover. Unacceptable grass stands shall be overseeded, after aeration by spiker, at half the original rate, as many times as necessary to establish an acceptable stand.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the City Engineer. If at the time when the contract has been otherwise completed it is not possible to make an adequate determination of the color, density, and uniformity of such stand of grass, payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as these requirements have been met.

3.2.8 CLEANUP

A. Disposal: remove surplus soil and waste material, unsuitable soil, trash, and debris and legally dispose of off-site.

END OF SECTION 02920

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